

Heugel
Application No. 10/675,885
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Amendments to the Drawings

Applicant encloses replacement sheets of figures 1, 2 and 3 in compliance with 37 CFR 1.121(d).

REMARKS

In the Office Action dated February 15, 2006, claims 12-24 are pending, claims 16-24 are withdrawn from consideration and claims 12-15 are rejected. Reconsideration is requested for at least the reasons discussed herein-below.

Figures 1, 2 and 3 have been re-submitted as suggested by the Examiner. No new matter is added.

Claim 12 is amended to further clarify the subject matter regarded as invention. No new matter is added. The scope of the claim is not changed.

Claims 12 - 15 are rejected under 35 U.S.C. §103(a) over Mattes, et al. (US 5,876,767; "Mattes") in view of Borstel, et al. (US 6,512,781; "Borstel"). Mattes discloses a device for the layer-by-layer manufacture of a three-dimensional object with a laser and a focusing unit. However, as admitted by the Examiner, Mattes *fails* to teach or suggest that the laser comprises a switching element for changing the modal composition of the laser radiation. Thus, the Examiner cites Borstel for a teaching of a method for changing the mode of a laser beam between Gaussian and ring modes.

Borstel discloses a laser having a switching element that can switch between the Gauß mode and the ring mode. However, Borstel does **not** teach or suggest using such a laser with switching element for the layer-by-layer manufacture of a three-dimensional object. Instead, at col. 1, lines 20-27 (cited by the Examiner), Borstel states that switching modes "is desirable for instance when cutting thicker sheet metal since the cutting width is large enough to permit the dross to be blown out."

Further, there is no teaching or suggestion in Mattes that it would be desirable to use a laser such as disclosed by Borstel for the layer-by-layer manufacture of a three-dimensional object. Thus, it is not seen how one of ordinary skill in the art would have combined the teachings of Mattes and Borstel.

In addition, in the present invention, the modal composition of the laser is actually changed during manufacture of a three-dimensional object. Borstel does **not** give any hint of a suggestion to actually change the modal composition of the laser during such a manufacturing process. Applicants submit that the switching element of Borstel is not adapted such that the modal composition of the laser is changed during manufacture of a three-dimensional object because the disclosed laser has no relation to such a manufacturing device.

Thus, it is submitted that a skilled person would not combine Mattes and Borstel. Even if a skilled person would combine these documents, a skilled person would not find any hint of a suggestion to adapt the switching element such that the modal composition of the laser is changed during manufacture of a three-dimensional object.

None of the cited prior art documents contain any hint to vary the beam focus during the layerwise manufacturing of a three-dimensional object. Even if a skilled person would have had the idea to vary the beam focus for different areas of the object to be formed, he would have varied the beam focus in a conventional way by using a focusing device capable of doing so.

However, according to the invention the beam focus is varied by changing the modal composition of the laser. With this solution, the disadvantages described in the present specification, particularly in the first paragraph on page 5, are circumvented and the manufacturing time becomes shorter.

Neither Mattes nor Borstel give even a hint of a suggestion that using the mode control in a device for layerwise manufacturing of a three-dimensional object can be advantageous. In particular, none of the cited art teach or suggest that varying the beam focus by using different laser modes can be advantageous over varying the beam focus by means of a focusing unit.

Thus, it is not seen how the present invention would have been obvious to one of ordinary skill in the art in view of any combination of Mattes and Borstel.

Claims 12 - 15 are rejected under 35 U.S.C. §103(a) over Smith (US 6,391,245) in view of Borstel. Smith, like Mattes (discussed above), *fails* to teach or suggest that the laser comprises a switching element for changing the modal composition of the laser radiation. Thus, the Examiner cites Borstel for a teaching of a method for changing the mode of a laser beam between Gaussian and ring modes.

Borstel is discussed in detail above. For the same reasons that one of ordinary skill in the art would not have combined the teachings of Mattes and Borstel, the person of ordinary skill in the art would not have combined the teachings of Smith and Borstel.

There is no teaching or suggestion in Smith that it would be desirable to use a laser such as disclosed by Borstel for the layer-by-layer manufacture of a three-dimensional object.

Nor does Smith give even a hint of a suggestion that using the mode control in a device for layerwise manufacturing of a three-dimensional object can be advantageous.

Thus, it is not seen how the present invention would have been obvious to one of ordinary skill in the art in view of any combination of Smith and Borstel.

Claims 12 - 15 also are rejected under 35 U.S.C. §103(a) over Mattes or Smith, either in view of Borstel, et al. (EP 00118825.9; "Borstel EP"). As discussed above, both Mattes and Smith *fail* to teach or suggest that the laser comprises a switching element for changing the modal composition of the laser radiation. Thus, the Examiner cites Borstel EP for a teaching of a method for changing the mode of a laser beam between Gaussian and ring modes.

However, Borstel EP is the priority application for Borstel (US), which is discussed above. One of ordinary skill in the art would not have combined Mattes or Smith with Borstel EP for the same reasons that such person of ordinary skill in the art would not have combined Mattes or Smith with Borstel (US).

Thus, it is not seen how the present invention would have been obvious to one of ordinary skill in the art in view of any combination of Mattes, Smith, Borstel EP and Borstel (US).

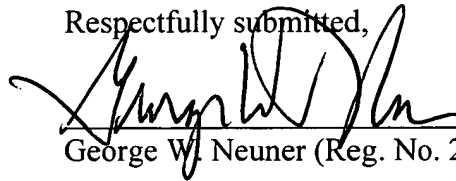
In view of the discussion above, it is respectfully submitted that the present application is in condition for allowance. An early reconsideration and notice of allowance are earnestly solicited.

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If for any reason a fee is required, a fee paid is inadequate or credit is owed for any excess fee paid, the Commissioner is hereby authorized and requested to charge Deposit Account No. **04-1105**.

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Respectfully submitted,


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